DAC

#9

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

NATURE APPLICATION		DOCKET NO.:	51193
OF:	BURST ET AL.	CONFIRMATION NO.:	2456
SERIAL NO.:	09/782,305	GROUP ART UNIT:	1797 (*formerly 1764*)
FILED:	(FEBRUARY 14, 2001)	EXAMINER:	V. MANOHARAN

FOR: DIVIDING WALL COLUMN FOR FRACTIONATION OF A MULTICOMPONENT MIXTURE

Mail Stop: Petitions
Honorable Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

I hereby certify that this correspondence, including all cited Exhibits and attachments, are being deposited with the United States Postal Service with sufficient postage as first class mail in an envelope addressed to Commissioner for Patents and Trademarks, Alexandria, VA 22313-1450, on:

April 21, 2010
Date of Deposit
SLAWOMIR MOSIOLEK
Person Making Deposit
Signature Mosiolek

PETITION UNDER 37 C.F.R. §1.181
TO WITHDRAW THE HOLDING OF ABANDONMENT

Sir:

Applicants herewith respectfully petition to the Honorable Commissioner to withdraw the holding of abandonment indicated in a Notice of Abandonment dated June 02, 2004, and to render a decision on applicants' Petition mailed on July 10, 2002 (*date of Certificate of Mailing*).

SUMMARY AND STATEMENT:

1) The application was deposited with the United States Patent and Trademark Office (*in the following referred to as the "Office"*) by the Law Offices of Keil & Weinkauf (*in the following referred to as "Keil & Weinkauf"*) on behalf of applicants on February 14, 2001. A return postcard, date-stamped by the Office confirms receipt of the specification, declaration, assignment, preliminary amendment, check for $750.00 and 3 sheets of drawings. Copies of the enumerated papers except for the check and collectively marked as (**A**), are herewith enclosed. Also enclosed herewith and marked as (**B**) is a copy of the date-stamped return postcard.

2) An official Filing Receipt issued on March 23, 2001, a copy of which, marked as (**C**), is herewith enclosed. The official Filing Receipt does not acknowledge that drawings were deposited with the application papers.

3) On June 21, 2002, the Office issued a Notice that the official Filing Receipt of March 23, 2001, was withdrawn, as well as a Notice of Incomplete Nonprovisional Application asserting that the application had been deposited without drawings. Copies of the Notices, marked as (**D**) and (**E**), respectively, are herewith enclosed. The due date 2 month from the date of the Notice (**E**), i.e., August 21, 2002, was entered into the Keil & Weinkauf docket book. A copy of the respective page of the docket book, marked as (**F**), is herewith enclosed.

4) On July 10, 2002 (*date of the Certificate of Mailing*), Keil & Weinkauf, on behalf of applicants, petitioned to the Honorable Commissioner to accord the filing date of February 14, 2001, presenting evidence in the form of a copy of the acknowledging return postcard (**B**) and in the form of a copy of the attorney docket record for the dates from 2/13/2001 to 2/15/2001. A copy of the petition, including the enclosures and marked as (**G**), is herewith enclosed. The due date entry docketed in (**F**) was cleared on July 10, 2002, i.e., the date on which the Petition (**G**) was deposited.

5) Receipt of the petition on July 15, 2002, including the enclosures, was acknowledged by the Office by date-stamped return postcard, a copy of which, marked as (**H**), is herewith enclosed.

6) On June 02, 2004, the Office mailed a Notice of Abandonment, and a copy (**I**) is provided which is from the Keil & Weinkauf case file. The Notice asserts that the application was abandoned for failure to timely or properly reply to the Notice mailed on June 21, 2002. It is pointed out, however, that a hand written statement on a Post-It note believed in the hand of Mary Lu Chadwick, a member of the clerical staff at Keil & Weinkauf in 2004 states that "[t]his is a mistake we have already filed a Petition 7-10-02 no response from PTO." No due date was entered into the Keil & Weinkauf docket in connection with the Notice (**I**), and no further action was taken at this juncture, as it was applicants' and its representatives' intent and belief that the application was properly pending.

8) The file wrapper was transferred from Keil & Weinkauf to the Law Offices of Novak, Druce + Quigg, LLP (*in the following referred to as "Novak Druce"*) in February 2005.

9) On February 11, 2010, applicants' foreign counsel, the Law Offices of Isenbruck, Bösl, Hörschler, Wichmann LLP (*in the following referred to as "Isenbruck"*) contacted Novak Druce inquiring about the status of the Petition (**G**).

10) The current Petition under 37 C.F.R. §1.181 follows:

RELIEF REQUESTED:

In light of the particular circumstances of this case it is respectfully solicited that the Honorable Commissioner consider applicants' present Petition under 37 C.F.R. §1.181 on its merits, and that the Petition not be dismissed as untimely.

Moreover, and for the following reasons, applicants respectfully request that the Honorable Commissioner withdraw the Holding of Abandonment mailed on June 02, 2004, that the Honorable Commissioner favorably review and consider applicants' Petition (G) mailed on July 10, 2002, and received by the Office on July 15, 2002, and that the application be accorded a filing date of February 14, 2001, including the acknowledged drawings. Favorable action is respectfully solicited.

MEMORANDUM

On the facts which are summarized above and the evidence presented herewith, applicants respectfully assert that the application papers which were deposited with the Office on February 14, 2001, included 3 sheets of drawings, and that the application papers, thus, should have been accorded a filing date of February 14, 2001.

MPEP §503 explains:[1]

> *A postcard receipt which itemizes and properly identifies the items which are being filed serves as* prima facie *evidence of receipt in the USPTO of all the items listed thereon on the date stamped thereon by the USPTO. ...*
>
> *The person receiving the item(s) in the PTO will check the listing on the postcard against the item(s) being filed to be sure they are properly identified and that all the items listed on the postcard are presently being submitted to the PTO. If any of the items listed on the postcard are not being submitted to the PTO, those items will be crossed off and the postcard initialed by the person receiving the items.*

No items on the return postcard (B) were crossed off by the Office, and the copy of the respective return postcard, thus, is *prima facie* evidence that the application papers (A), including 3 sheets of drawings, were received by the Office on February 14, 2001, and that the papers met the provisions of 37 C.F.R. §1.53(b).

---

[1] MPEP §503, Rev. 1, Feb. 2000, page 500-12.

Therefore, applicants respectfully assert that the Notice of Incomplete Nonprovisional Application (**E**) mailed on June 21, 2002, was issued in error, and that the application should have been accorded a filing date of February 14, 2001, as Petitioned on July 10, 2002, and subsequently acknowledged by the Office by return post card on July 15, 2002.

On the facts which are summarized above and the evidence presented herewith, applicants further respectfully assert that applicants took appropriate action in a timely manner to have the erroneous Notice (**E**) of June 21, 2002, withdrawn and to have the filing date properly accorded.

37 C.F.R. §1.53(e)(2)[2] lays out the actions which are to be taken by an applicant who has received notice from the Office that an application does not meet the filing requirements under 37 C.F.R. §1.53(b). Accordingly,

> *Any request for review of a notification pursuant to paragraph (e)(1) of this section, or a notification that the original application papers lack a portion of the specification or drawing(s), must be by way of a petition pursuant to this paragraph accompanied by the fee set forth in § 1.17(h). In the absence of a timely (§ 1.181(f)) petition pursuant to this paragraph, the filing date of an application in which the applicant was notified of a filing error pursuant to paragraph (e)(1) of this section will be the date the filing error is corrected.*

Correspondingly, MPEP §601.01(f) explains:[3]

> *Applicant may file a petition under 37 CFR 1.53(e) with the petition fee set forth in 37 CFR 1.17(h), asserting that (1) the drawing(s) at issue was submitted, or (2) the drawing(s) is not necessary under 35 U.S.C. 113 (first sentence) for a filing date. The petition must be accompanied by sufficient evidence to establish applicant's entitlement to the requested filing date (e.g., a date-stamped postcard receipt (MPEP § 503) to establish prior receipt in the USPTO of the drawing(s) at issue).*

The Petition (**G**) was deposited by applicants on July 10, 2002, and received by the Office on July 15, 2002, i.e., within the 2 month period referenced in 37 C.F.R. §1.181(f). Thus, the

---

2. 48 FR 2709, Jan. 20, 1983, effective Feb. 27, 1983; paras. (b) and (d), 49 FR 554, Jan. 4, 1984, effective Apr. 1, 1984; para. (c), 50 FR 31826, Aug. 6, 1985, effective Oct. 5, 1985; paras. (c) and (d), 53 FR 47808, Nov. 28, 1988, effective Jan. 1, 1989; paras. (b) and (c), 54 FR 47518, Nov. 15, 1989, effective Jan. 16, 1990; paras. (a)-(e) revised, 60 FR 20195, Apr. 25, 1995, effective June 8, 1995; revised, 62 FR 53131, Oct. 10, 1997, effective Dec. 1, 1997; para. (d) revised, 63 FR 5734, Feb. 4, 1998, effective Feb. 4, 1998 (adopted as final, 63 FR 36184, Jul. 2, 1998); paras. (c)(3), (c)(4) and (d) revised, 65 FR 14865, Mar. 20, 2000, effective May 29, 2000 (paras. (c)(4) and (d) adopted as final, 65 FR 50092, Aug. 16, 2000); para. (c)(3) revised, 65 FR 50092, Aug. 16, 2000, effective Aug. 16, 2000; paras. (c)(1), (c)(2), (d)(4), (e)(2), (f), and (g) revised and para. (d)(10) added, 65 FR 54604, Sept. 8, 2000, effective Nov. 7, 2000; para. (c)(4) revised, 65 FR 78958, Dec. 18, 2000.

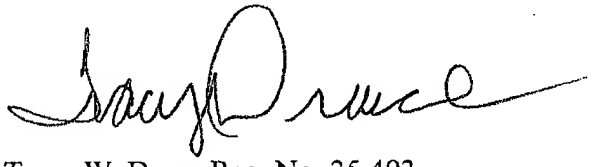
3 MPEP §601.01(f), August 2001, page 600-15.

Petition (G) was filed in a timely manner. The Petition (G) included an authorization to charge the petition fee under 37 C.F.R. §1.17(h) in the amount of $130.00 to the Deposit Account of Keil & Weinkauf, and also included an authorization to charge any shortage in fees due in connection with the filing of the Petition (G) to the Deposit Account. The Petition (G), therefore, was accompanied by the necessary petition fees. Moreover, applicants' Petition (G) included a copy of the date-stamped postcard receipt pursuant to MPEP §503 establishing receipt of the drawings at issue by the Office. In addition, applicants' Petition (G) also included a copy of the attorney docket record *inter alia* for February 14, 2001, in which the deposition of the application papers including 3 sheets of drawings was recorded. The Petition (G), therefore, is deemed to have been accompanied by sufficient evidence to establish applicants' entitlement to the requested filing date.

Therefore, applicants respectfully assert that the Notice of Abandonment mailed on June 2, 2004, was issued in error, and should be withdrawn as was requested in applicants' Petition (G) mailed on July 10, 2002.

The Honorable Commissioner is herewith authorized to charge any fees under 37 C.F.R. §1.181 or §1.16 or §1.17 that may be required in connection with this paper, or credit any overpayment, to Deposit Account No. 14.1437, referencing Attorney Docket No.: 51193.

Respectfully submitted,
NOVAK DRUCE + QUIGG, LLP



Tracy W. Druce Reg. No. 35,493

Customer No.: 26474
1300 Eye Street, N.W.
Suite 1000 West Tower
Washington, S.C. 20005
(202) 659-0100

TWD/BAS

Encl.: (A) Specification, declaration, assignment, preliminary amendment, and 3 sheets of drawings (33 pages)
(B) U.S. PTO return postcard date-stamped February 14, 2001 (1 page)
(C) Filing Receipt, mailing date March 23, 2001 (4 pages)
(D) Withdrawal of previous Filing Receipt, mailing date June 21, 2002 (1 page)
(E) Notice of Incomplete Nonprovisional Application, mailing date June 21, 2002 (1 page)
(F) Keil & Weinkauf docket entries for August 21, 2002 (1 page)
(G) Petition to Accord Filing Date, date of deposit July 10, 2002 (4 pages)
(H) U.S. PTO return postcard date-stamped July 15, 2002 (1 page)
(I) Notice of Abandonment, mailing date June 02, 2004 (3 pages)

APPENDIX A

Please type a plus sign (+) inside this box->/ + /

UTILITY	Atty Doc. No. 51193 Total Page 17
PATENT APPLICATION	FIRST NAMED INVENTOR OR APPLICATION IDENTIFIER
TRANSMITTAL	Wolfram BURST
	Express Mail Label No.

Application Elements

Address To: Assistant Commissioner for Patents
Box Patent Application
Washington, D.C. 20231

1. / X / Fee transmittal Form
(Submit an original, and a duplicate for fee processing)
2./ X /Specification Total Pages /
(Preferred arrangement set for below)

Descriptive title of the Invention
Cross References to Related Application
Statement Regarding Fed. Sponsored R & D
Reference to Microfiche Appendix
Background of the Invention
Brief Summary of the Invention
Brief Description of the Drawings (if filed)
Detailed Description
Claim(s)
Abstract of the Disclosure

3./ / Drawing(s)(35 USC 113)(Figs.) Total Sheets / /
4./ X /Oath or Declaration Total Pages/ 3 /
a / X/ Newly executed (original or copy)
b./ /Copy from a prior application (37 CFR 1.63(d)
(For Continuation/Divisional with Box 17 completed)
Note Box 5 below
i./ / DELETION OF INVENTOR(S)
Signed statement attached deleting inventor(s) named in the prior application see 37 CFR 1.63(d)(2) and 1.33(b).
5. / / Incorporation by reference (useable if Box 4b is checked)
The entire disclosure of the prior application, from which a copy of the oath or declaration is supplied under Box 4b is considered as being part of the disclosure of the accompanying application and is hereby incorporated by reference therein.

6. / / Microfiche Computer Program (Appendix)
/7./ /Nucleotide and/or Amino Acid Sequence Submission
(if applicable, all necessary)
a./ / Computer Readable Copy
b/ / Paper Copy (Identical to computer copy)
c/ / Statement verifying identity of above copies

ACCOMPANYING APPLICATIONS PARTS

8./ X / Assignment Papers (cover sheet & document(s)
9/ / 37 CFR 3.73(b)Statement / /Power of Attorney
10./ /English Translation Document (if applicable)
11./ /Information Disclosure / / Copies of IDS Citations
12./ X /Preliminary Amendment
13./ x/Return Receipt Postcard (MPEP 503)
Should be specifically itemized)
14./ /Small Entity / /Statement filed in prior application
Statements Status still proper and desired
15./ / Certified Copy of Priority Document(s)
(if foreign priority is claimed)
16./ / Other_____

17. If a Continuing Application, check appropriate box and supply the requisite information:
/ /Continuation / /Divisional / / Continuation-in part (CIP) of prior application No._____

CORRESPONDENCE ADDRESS

/ / Customer Number or Bar code Label or / / Correspondence address below

Insert Customer No. or Attach bar code label here

Name: Herbert B. Keil
KEIL & WEINKAUF

Address: 1101 Connecticut Ave., N.W.

City Washington State: D.C. Zip Code 20036

Country USA Telephone: (202)659-0100 Fax: (202)659-0105

The filing fee has been calculated as shown below:

For:	Number Filed	Number Extra	SMALL/LARGE ENTITY	BASIC FEE $355./$710.
Basic Fee.....				$ 710.00
Total Claims:	7	-20 = _____	x $09./$18.	= _____
Indep. Claims:	1	-3 = _____	x $40./$80.	= _____
[ ] Multiple Dependent Claim(s) presented:			$135./270	= _____
[x] A check is enclosed for the filing fee.				$ 710.00

*If the difference is less than zero, enter "0".

[X] A check for $750.00 for the filing fee and assignment recordation.

[X] The Commissioner is hereby authorized to charge any other fee required, including the issue fee, in connection with the filing and prosecution of this application, and to the extent necessary, applicant(s) hereby petition for extension(s)of time under 37 CFR 1.136, to be charged to our Deposit Account 11-0345.

Respectfully submitted,
KEIL & WEINKAUF

/HBKeil/

Herbert B. Keil
Reg. No. 18,967

1101 Connecticut Ave., N.W
Washington, D.C. 20036
(202)659-0100

BASF Aktiengesellschaft

February 08, 2001

NAE19991202US IB/Ar/els

Dividing wall column for fractionation of a multicomponent mixture

The present invention relates to a dividing wall column for the fractionation of a multicomponent mixture and a process for isolating pure ethylhexyl p-methoxycinnamate by distillation.

In the fractionation of feed mixtures into more than two highly pure fractions, for example into low boilers, intermediate boilers and high boilers, it is normally necessary to use a plurality of distillation columns. To limit the outlay in terms of apparatus, the fractionation of multicomponent mixtures consisting of more than two components is carried out using columns which are suitable for taking off liquid and gaseous media at side offtakes. However, the utility of distillation columns having side offtakes is greatly restricted by the fact that products taken off at the side offtakes are normally not completely pure. In the case of products taken off at the side in the enrichment section of a distillation apparatus, which are usually taken off in liquid form, the side products still contain proportions of low-boiling components which are normally taken off at the top. An analogous situation applies to products taken off at the side in the stripping section, which are usually taken off in vapor form and still contain proportions of the high boiler. When using such conventional side offtake columns, contaminated side products are virtually

always obtained, so that the use of side offtake columns is unsuitable for the isolation of pure substances.

For this reason, it is generally necessary to use column assemblies comprising at least two separate columns, especially for the isolation of intermediate-boiling pure substances from multicomponent mixtures.

An advantageous alternative is provided by dividing wall columns. The use of dividing wall columns likewise makes it possible to isolate side products, i.e. intermediate-boiling components, in pure form from multicomponent mixtures. In dividing wall columns, a dividing wall is installed in the middle region. This extends above and below the feed point. On the other side, which is located opposite the feed point, there is provided at least one side offtake located at the same height as or above or below the feed point. The dividing wall is located between side offtake and feed point. The dividing wall is arranged vertically. In the region of the column which is divided by the dividing wall, transverse mixing of liquid and vapor streams is not possible. This reduces the total number of distillation columns required in the fractionation of multicomponent mixtures. A dividing wall column generally has the following segments:

- an upper column region located above the dividing wall,
- a feed section located on the side of the feed point and bounded laterally by the dividing wall,
- an offtake section located on the side of the side offtake and is bounded laterally by the dividing wall and
- a lower column region located below the dividing wall.

The enrichment section of the feed section is the upper region of the feed section located above the feed point, and the stripping section of the feed section is the lower part of the feed section located below the feed point. The offtake section is divided into an upper part located above the side offtake and a lower part located below the side offtake. A dividing wall column is in principle a constructional simplification of thermally coupled distillation columns, but the latter incur higher capital costs. Dividing wall columns and thermally coupled columns offer advantages over an assembly of conventional distillation columns both in respect of energy consumption and in terms of capital costs and their use is therefore preferred in industry. Dividing wall columns can be configured either as packed columns containing random or ordered packing or as tray columns. If packed columns containing ordered packing are used, ordered mesh packing having a specific surface area of from 300 to 800 m^2/m^3, preferably from 500 to 750 m^2/m^3, is particularly suitable. Dividing wall columns are usually configured so that the dividing wall runs vertically and the cross-sectional areas of the offtake section and of the feed section are equal. Further information on dividing wall columns is given, for example, in EP-A-0 122 367, EP-B-0 126 288 and EP-B-0 133 510.

It is an object of the present invention to provide a dividing wall column which has lower operating costs and gives better separation performance than previously known dividing wall columns, particularly at low operating pressures of from about 0.5 to 20 mbar. Particular attention should be paid to the segments of this dividing wall column being optimally utilized in the distillation process.

We have found that this object is achieved by a dividing wall column divided in the middle region into a feed section and an offtake section by a dividing wall and having as segments

a) an upper column region,
b) an enrichment section of the feed section,
c) a stripping section of the feed section,
d) an upper part of the offtake section,
e) a lower part of the offtake section,
f) an intermediate region of the feed section,
g) an intermediate region of the offtake section and
h) a lower column region,

where the dividing wall is located vertically between the segments b) and d) and between the segments c) and e), the segments b), d), c) and e) have separation-active internals and the cross-sectional area A_b of the segment b) is at least 10% smaller than the cross-sectional area A_d of segment d), and the cross-sectional area A_c of the segment c) is at least 10% greater than the cross-sectional area A_e of segment e).

Segment f) is located between the segments b) and c) and, correspondingly, segment g) is located between the segments d) and e). The segments b) and d) usually have the same number and same types of separation-active internals. In general, the segments c) and e) have the same number and same types of separation-active internals. The upper column region and the lower column region preferably contain separation-active internals, but the intermediate region usually has no separation-active internals.

The advantage of the dividing wall column of the present invention is that, particularly at low operating

pressures of from about 0.5 to 20 mbar, the separation can be carried out at lower cost and with a better separation performance than when using a dividing wall column of the prior art. These advantageous results are achieved, in particular, in applications in which, as a result of the multicomponent mixture fed in, the load in the segments b) and e) is comparatively low and the load in the segments c) and d) is comparatively high. Thus, the dimensions of the segments are designed according to the F factor. The F factor is a measure of the load due to the gas stream in the column, namely a measure of the impulse of this gas (F factor: gas velocity in m/s multiplied by the root of the gas density in kg/m^3). At a higher F factor, a greater cross-sectional area is accordingly provided in the segment concerned. This leads to optimal loading of this segment and thus to better separation performance. Conversely, segments which have a lower loading are made smaller so that sufficient wetting of the separation-active internals present by a liquid film is ensured; if the latter segments were to have larger dimensions, corresponding separation-active internals would normally not be completely wetted. Complete wetting of the separation-active internals is, however, a prerequisite for a high separation performance. The dividing wall column of the present invention can thus be matched optimally to the respective separation task - no segments having unnecessarily large dimensions for the separation problem concerned are installed, as a result of which the outlay in terms of apparatus is reduced and the corresponding separation process can be made more cost effective.

The segments may, if desired, also be provided with various separation-active internals and distribution devices for liquid. For applications in the subatmospheric pressure range, it is possible to provide

specific distributors whose design and dimensions are chosen in conjunction with the determination of the ratios of the cross sections of the segments. The corresponding ratios of the cross sections are usually chosen so that favorable conditions for liquid distribution are obtained, particularly at low operating pressures of from about 0.5 to about 20 mbar at low liquid downflow densities. The separation internals in the segments are generally selected so that they incur minimal capital costs. The preferred ratio of the cross-sectional areas depends on the division ratio of the liquid at the upper end of the dividing wall and on the operating pressure P. For the purposes of the present invention, the operating pressure is the pressure at the top of the dividing wall column.

In general, the cross-sectional area A_b of the segment b) is at least 40%, preferably at least 60%, smaller than the cross-sectional area A_d of segment d). Furthermore, the cross-sectional area A_c of the segment c) is usually at least 40%, preferably at least 60%, greater than the cross-sectional area A_e of segment e).

In a preferred embodiment of the invention, the operating pressure P is in the range from 0.0005 to 10 bar and the calculated ratios of the cross-sectional areas A'_b/A'_d and A'_c/A'_e are given by the following relationships:

$$\frac{A'_b}{A'_d} = \left(\frac{m_{s,b}}{m_{s,d}}\right) \times \left(\frac{m_{i,b}}{m_{i,d}}\right)^C$$

$$\frac{A'_c}{A'_e} = \left(\frac{m_{s,c}}{m_{s,e}}\right) \times \left(\frac{m_{i,c}}{m_{i,e}}\right)^C$$

Here, A'_b, A'_d, A'_c, A'_e are the cross-sectional areas of the segments b,d,c,e provided for the calculation; $m_{s,b}$,

$m_{s,d}$, $m_{s,c}$, $m_{s,e}$ are the volume flows of gas through the segments b,d,c,e, measured in m^3/h; $m_{i,b}$, $m_{i,d}$, $m_{i,c}$, $m_{i,e}$ are the volume flows of liquid through the segments b,d,c,e, measured in m^3/h, and the exponent C is obtained as operating-pressure-dependent variable from the empirically determined function shown in Fig. 3. The calculated ratios A'_b/A'_d and A'_c/A'_e deviate from the corresponding, actual ratios A_b/A_d and A_c/A_e by not more than 30%, preferably not more than 20%. In the dividing wall column, correspondingly desired area ratios can also be realized for ordered packing, since the manufacture of the ordered packing elements is now usually computer controlled in the manufacturing companies.

In the design of the dividing wall column, the separation stages should preferably be divided so that the height of the segment b) together with that of the segment e) is as close as possible to the height of the segment c) together with that of the segment d). If unequal heights of the separation internals cannot be circumvented, subregions in the segments b) and e) or in the segments c) and d) are not provided with separation internals. However, appropriate choice of separation internals of different separation performance usually allows such free spaces to be avoided in practice.

The operating pressure of the dividing wall column is frequently in the range from 0.0005 to 0.02 bar and use is made of liquid distributors in which the liquid distribution occurs by the bank-up principle and the downstream fine liquid distribution occurs by the capillary principle. The number of drip points is preferably from about $200/m^2$ to $1\ 000/m^2$. Preferred construction types are channel groove distributors. Also suitable are channel groove distributors in which

the capillary liquid distribution is circular and also ones in which the capillary liquid distribution is linear. However, all these different construction types can distribute small amounts of liquid in a high degree of dispersion over large cross-sectional areas. Together with the optimized ratios of the cross sections of the segments, advantageous constructions are thus obtained for columns which operate at low pressures of from 0.5 to 10 mbar.

Ordered packing elements having a cross-channel structure are frequently used as separation-active internals. Here, the uppermost packing element below the liquid distributor is usually aligned so that the individual layers run parallel to the dividing wall.

In the construction of the dividing wall column, the dividing wall is preferably fixed to the column wall by welding. However, it is also possible in principle to provide releasable connections or to mount the dividing wall unfastened between the packing elements, as described in EP-A-0 804 951. The part of the dividing wall which is located between the segments f) and g) is generally fixed in place by welding. The dividing wall between the segments f) and g) is generally arranged obliquely and usually forms an angle of from 25 to 75°, preferably from 55 to 65°, to the horizontal. In this arrangement, turbulence in the gas stream, which can adversely affect the separation performance, is largely avoided.

In general, the liquid is conveyed to the feed section by means of a pump or is introduced in a flow-controlled manner via a static feed height of at least about 1 m. The flow control is usually set so that the amount of liquid introduced into the feed section cannot drop below 30% of the "normal value" (for the

present purposes, the normal value is the amount, averaged over time, obtained per unit time at a particular point in the corresponding continuous process). The division of the liquid flowing down from the segment d) in the offtake section to the side offtake and to the segment e) in the offtake section is generally set by means of a flow control so that the amount of liquid flowing into the segment e) cannot drop below 30% of the "normal value".

The liquid can be taken off and divided at the upper end of the dividing wall and at the side offtake by means of either internal collection spaces for the liquid or such spaces located outside the column. These collection spaces assume the function of a pump reservoir. In the case of tray columns, it is particularly useful for this purpose to increase the downflow shaft to about 2 to 3 times the customary height and to store the appropriate amount of liquid in the downflow shaft. When using packed columns, the liquid is firstly collected in collectors and from there conveyed into an internal or external collection space. In general, pivoting funnels offer an inexpensive alternative. In the case of tray columns and if pressures are relatively high, the liquid can also advantageously be banked up in a chimney tray.

In a preferred embodiment of the invention, the feed mixture introduced contains from 70 to 95%, preferably from 75 to 90%, of ethylhexyl p-methoxycinnamate as intermediate-boiling desired product.

In addition to ethylhexyl p-methoxycinnamate, this mixture usually further comprises from 1 to 5% of lower-boiling by-products and from 5 to 25% of higher-boiling by-products. The number of theoretical plates in the dividing wall column used is then usually about 35 and the ratios of the cross-sectional areas A_b/A_d are

generally from 1 : 1.6 to 1 : 2.4, preferably from 1 : 1.8 to 1 : 2.2, and the ratios A_c/A_e are from 1 : 1.6 to 1 : 2.4, preferably from 1 : 1.8 to 1 : 2.2. Correspondingly, the dividing wall column is then operated at a pressure at the top of from 1 to 10 mbar, preferably from 4 to 6 mbar.

The present invention also provides a process for isolating pure ethylhexyl p-methoxycinnamate by distillation using a dividing wall column as described above. In the process of the present invention, the feed mixture (11, 12, 13) introduced comprises from 70 to 95%, preferably from 75 to 90%, of ethylhexyl p-methoxycinnamate as intermediate-boiling desired product (12).

In the accompanying drawing,

- Fig. 1 schematically shows a dividing wall column according to the prior art,
- Fig. 2 schematically shows a dividing wall column according to the present invention and
- Fig. 3 shows the dependence of the empirically determined exponent C on the operating pressure of the dividing wall column.

Fig. 2 shows the fractionation of a multicomponent feed mixture 11, 12, 13 in a dividing wall column according to the present invention to give a low boiler 11, an intermediate-boiling desired product 12 and a high boiler 13. The dividing wall 7, 8 is vertical in its upper and lower sections 7 and is arranged obliquely in its middle section 8. The upper column region 1 is located above the dividing wall 7, 8, and the lower column region 6 is located below the dividing wall 7, 8. The feed line opens into segment f) 9 and the side offtake is connected to the segment g) 10.

The invention is illustrated below by means of an example.

Example:

The dividing wall column used as experimental column had a diameter of 0.2 meters, was provided over a total height of 7 meters with wire mesh packing having a specific surface area of 500 m^2/m^3 and contained a total of 41 theoretical plates. The dividing wall was welded in place between the 8th and 30th stages (counted from the bottom). The feed point and the offtake point for the liquid taken off at the side were located at the same height. The liquid was divided in a flow ratio of 1 : 3 between the segments b) 2 and d) 3 of the column. The ratio of areas of the segments b) 2 and d) 3 of the column was 1 : 2, and the ratio of the areas of the segments c) 4 and e) 5 of the column was 2 : 1. The middle region 8 of the dividing wall 7, 8 was arranged obliquely and had an angle of 60° to the horizontal. The pressure at the top was 5 mbar. The feed mixture 11, 12, 13 was introduced into the column in liquid form at a flow rate of 8.5 kg/h and a temperature of about 170°C. The feed mixture comprised 85% of ethylhexyl p-methoxycinnamate, 5% of lower-boiling by-products and 10% of higher-boiling by-products. At the top of the column, about 0.5 kg/h of lower-boiling by-products having a residual ethylhexyl p-methoxycinnamate content of 5% was taken off at a reflux ratio of 12. The bottom product, which comprised predominantly higher-boiling by-products, was taken off in an amount of about 0.9 kg/h and contained 5% of ethylhexyl p-methoxycinnamate. The intermediate-boiling desired product 12, namely ethylhexyl p-methoxycinnamate, was taken off as a liquid in an amount of about 7.1 kg/h and a purity of > 99.5% at the side offtake.

The above experiment shows that certain multicomponent mixtures can be fractionated effectively: the

intermediate-boiling desired product can be isolated in high purity. The above-described dividing wall column of the present invention enables, at a constant flow of the feed mixture introduced, the intermediate-boiling desired product to be obtained in a higher purity than when using a customary dividing wall column according to the prior art. This is due, inter alia, to the comparatively low pressure drop in the dividing wall column of the present invention. The lower pressure drop makes it possible for the dividing wall column to be operated at relatively low temperatures at the bottom. Low temperatures at the bottom result not only in energy savings but also in reduced formation of by-products which could get into the product taken off at the side. A dividing wall column according to the prior art would have to be correspondingly larger and require a higher energy input to achieve the same separation performance.

BASF Aktiengesellschaft

08 February 2001
NAE19991202US IB/AR/els

We claim:

1. A dividing wall column divided in the middle region into a feed section and an offtake section by a dividng wall and having as segments

   a) an upper column region,

   b) an enrichment section of the feed section,

   c) a stripping section of the feed section,

   d) an upper part of the offtake section,

   e) a lower part of the offtake section,

   f) an intermediate region of the feed section,

   g) an intermediate region of the offtake section and

   h) a lower column region,

   where the dividing wall is located vertically between the segments b) and d) and between the segments c) and e) , the segments b) , d) , c) and e) have separation-active internals and the cross-sectional area A_b of the segment b)) is at least 10% smaller than the cross-sectional area A_d of segment d) , and the cross-sectional area A_c of the segment c) is at least 10% greater than the cross-sectional area A_e of segment e) .

2. A dividing wall column as claimed in claim 1, wherein the cross-sectional area A_b of the segment b) is at least 40%, preferably at least 60%, smaller than the cross-sectional area A_d of segment d) .

3. A dividing wall column as claimed in claim 1, wherein the cross-sectional area A_c of the segment c) is at least 40%, preferably at least 60%, greater than the cross-sectional area of segment e) .

4. A dividing wall column as claimed in claim 1, wherein the dividing wall is arranged obliquely between the segments f) and g) and forms an angle of from 25 to 75°, preferably from 55 to 65°, to the horizontal.

5. A dividing wall column as claimed in claim 1, wherein the operating pressure P is in the range from 0.0005 to 10 bar and the calculated ratios of the cross-sectional areas A'_b/A'_d and A'_c/A'_e are given by the following relationships

$$\frac{A'_b}{A'_d} = \left(\frac{m_{s,b}}{m_{s,d}}\right) \times \left(\frac{m_{i,b}}{m_{i,d}}\right)^C$$

$$\frac{A'_c}{A'_e} = \left(\frac{m_{s,c}}{m_{s,e}}\right) \times \left(\frac{m_{i,c}}{m_{i,e}}\right)^C$$

where A'_b, A'_d, A'_c, A'_e are the cross-sectional areas of the segments b,d,c,e provided for the calculation; $m_{s,b}$, $m_{s,d}$, $m_{s,c}$, $m_{s,e}$ are the volume flows of gas through the segments b,d,c,e, measured in m^3/h; $m_{i,b}$, $m_{i,d}$, $m_{i,c}$, $m_{i,e}$ are the volume flows of liquid through the segments b,d,c,e, measured in m^3/h, and the exponent C is obtained as operating-pressure-dependent variable from the empirically determined function shown in Fig. 3, and the calculated ratios A'_b/A'_d and A'_c/A'_e deviate from the corresponding, actual ratios A_b/A_d and A_c/A_e by not more than 30%, preferably not more than 20%.

6. A dividing wall column as claimed in claim 1, wherein the operating pressure is from 0.0005 to 0.02 bar and liquid distributors in which the liquid predistribution occurs by the bank-up principle and the downstream fine liquid distribution occurs by the capillary principle are used.

7. A dividing wall column as claimed in claim 1, wherein ordered packing having a cross-channel structure is used as separation-active internals.

8. A dividing wall column as claimed in claim 1, wherein ordered packing having a cross-channel structure is used as separation-active internals and the uppermost layer of packing below the liquid distributor is aligned so that the individual layers are aligned parallel to the dividing wall.

9. A process for isolating pure ethylhexyl p-methoxycinnamate by distillation using a dividing wall column as claimed in any of claims 1 to 8, wherein the feed mixture introduced comprises from 70 to 95%, preferably from 75 to 90%, of ethylhexyl p-methoxycinnamate as intermediate-boiling desired product.

BASF Aktiengesellschaft

February 08, 2001

NAE19991202US IB/AR/els

Dividing wall column for fractionation of a multicomponent mixture

Abstract

A dividing wall column comprises the following segments:

a) an upper column region (1),
b) an enrichment section (2) of the feed section,
c) a stripping section (4) of the feed section,
d) an upper part (3) of the offtake section,
e) a lower part (5) of the offtake section,
f) an intermediate region (9) of the feed section,
g) an intermediate region (10) of the offtake section and
h) a lower column region (6).

For the purposes of the present invention, it is essential that the dividing wall (7) is located vertically between the segments b) (2) and d) (3) and between the segments c) (4) and e) (5), the segments b) (2), d) (3), c) (4) and e) (5) have separation-active internals and the cross-sectional area A_b of the segment b) (2) is at least 10% smaller than the cross-sectional area A_d of segment d) (3), and the cross-sectional area A_c of the segment c) (4) is at least 10% greater than the cross-sectional area A_e of segment e) (5).

Fig. 2

Declaration, Power of Attorney and Petition

We (I), the undersigned inventor(s), hereby declare(s) that:

My residence, post office address and citizenship are as stated below next to my name,

We (I) believe that we are (I am) the original, first, and joint (sole) inventor(s) of the subject matter which is claimed and for which a patent is sought on the invention entitled

Dividing wall column for fractionation of a multicomponent mixture

the specification of which

[x] is attached hereto.

[ ] was filed on _____ as

Application Serial No. _____

and amended on _____.

[] was filed as PCT international application

Number _____

on _____,

and was amended under PCT Article 19

on _____ (if applicable).

We (I) hereby state that we (I) have reviewed and understand the contents of the above–identified specification, including the claims, as amended by any amendment referred to above.

We (I) acknowledge the duty to disclose information known to be material to the patentability of this application as defined in Section 1.56 of Title 37 Code of Federal Regulations.

We (I) hereby claim foreign priority benefits under 35 U.S.C. § 119(a)–(d) or § 365(b) of any foreign application(s) for patent or inventor's certificate, or § 365(a) of any PCT International application which designated at least one country other than the United States, listed below and have also identified below, by checking the box, any foreign application for patent or inventor's certificate, or PCT International application having a filing date before that of the application on which priority is claimed. Prior Foreign Application(s)

Application No.	**Country**	**Day/Month/Year**	**Priority Claimed**	
10008634.9	*Germany*	*24 February 2000*	[x] Yes	[ ] No

We (I) hereby claim the benefit under Title 35, United States Codes, § 119(e) of any United States provisional application(s) listed below.

(Application Number)	(Filing Date)
(Application Number)	(Filing Date)

We (I) hereby claim the benefit under 35 U.S.C. § 120 of any United States application(s), or § 365(c) of any PCT International application designating the United States, listed below and, insofar as the subject matter of each of the claims of this application is not disclosed in the prior United States or PCT International application in the manner provided by the first paragraph of 35 U.S.C. § 112, I acknowledge the duty to disclose information which is material to patentability as defined in 37 CFR § 1.56 which became available between the filing date of the prior application and the national or PCT International filing date of this application.

Application Serial No.	**Filing Date**	**Status (pending, patented, abandoned)**

And we (I) hereby appoint **HERBERT. B. KEIL**, Registration Number 18,967; and **RUSSEL E. WEINKAUF**, Registration Number 18, 495; the address of both being Messrs. Keil & Weinkauf, 1101 Connecticut Ave., N.W., Washington, D.C. 20036 (telephone 202–659–0100), our attorneys, with full power of substitution and revocation, to prosecute this application, to make alterations and amendments therein, to sign the drawings, to receive the patent, and to transact all business in the Patent Office connected therewith.

We (I) declare that all statements made herein of our (my) own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

Wolfram Burst
NAME OF SOLE OR FIRST INVENTOR

Signature of Inventor

Date January 5, 2001

Residence:
Illerstr.7
68199 Mannheim
Germany
Citizen of: Germany
Post Office Address: same as residence

Horst Hartmann
NAME OF SECOND JOINT INVENTOR

Signature of Inventor

Date January 5, 2001

Residence:
Lindenstr.45
67459 Böhl–Iggelheim
Germany
Citizen of: Germany
Post Office Address: same as residence

Gerd Kaibel
NAME OF THIRD JOINT INVENTOR

Signature of Inventor

Date January 5, 2001

Residence:
Robert–Bosch–Str.4
68623 Lampertheim
Germany
Citizen of: Germany
Post Office Address: same as residence

Guido Harms
NAME OF FOURTH JOINT INVENTOR

Signature of Inventor

Date January 5, 2001

Residence:
Mühlweg 51
67117 Limburgerhof
Germany
Citizen of: Germany
Post Office Address: same as residence

ASSIGNMENT RECORDATION FORM COVER SHEET
PATENTS ONLY

To the Honorable Commissioner of Patents and Trademarks:
Please record the attached original documents or copy thereof.

1. Name of conveying party(ies)
Wolfram BURST, Horst HARTMANN, Gerd KAIBEL,
Guido HARMS

Additional name(s) of conveying party(ies) attached / /Yes /X/No

3. Nature of conveyance:

/x/ Assignment / / Merger
/ / Security Agreement / / Change of Name

Execution Date: 1/5/01

2. Name and address of receiving party(ies)

BASF Aktiengesellschaft
Street Address:67056 Ludwigshafen
Germany

City:_____State:____ZIP_____

Additional name(s) & address(es) attached?
/ / Yes /x/ No

4. Application number(s) or patent number(s):

If this document is being filed together with a new application, the execution date of the application is:

FEB 1 4 2001

A. Patent Application No.(s)

B. Patent No.(s)

Additional numbers attached? / / Yes /x/ No

5. Name and address of party to whom correspondence concerning document should be mailed:

Name: Herbert B. Keil
Internal Address:

Street Address: Keil & Weinkauf
1101 Connecticut Ave. N.W
City: Washington State: D.C ZIP: 20036

6. Total number of applications and and patents involved: / 1 /

7. Total Fee(37 CFR 3.41).... $ 40.00
Since the omitted name was on the original document, no fee should be required.

8. Deposit Account 11-0345 if fee is deficient or not attached /X/

DO NOT USE THIS SPACE

9. Statement and signature.

To the best of my knowledge and belief, the foregoing information is true and correct and any attached copy is a true copy of the original document.

Herbert B. Keil — Name of Person Signing

/Herbert B. Keil/ — Signature

Feb. 12, 2001 — Date

Total number of pages 3

Assignment of Application

0050/051193

WHEREAS, I (WE)

Wolfram Burst, Illerstr.7, 68199 Mannheim, Germany
Citizen of Germany

Horst Hartmann, Lindenstr.45, 67459 Böhl–Iggelheim, Germany
Citizen of Germany

Gerd Kaibel, Robert–Bosch–Str.4, 68623 Lampertheim, Germany
Citizen of Germany

Guido Harms, Mühlweg 51, 67117 Limburgerhof, Germany
Citizen of Germany

respectively, have invented certain new and useful improvements in

Dividing wall column for fractionation of a multicomponent mixture

for which an application for Letters Patent was executed on

(Application No. , filed), and

WHEREAS, *BASF Aktiengesellschaft (hereinafter referred to as "ASSIGNEE"), having a place of business at 67056 Ludwigshafen, Germany, is* desirous of acquiring the entire right, title and interest in and to said invention and in and to any Letters Patent that may be granted therefore in the United States and its territorial possessions and in any and all foreign countries;

NOW, THEREFORE, in consideration of the sum of Five Dollars ($5.00), the receipt whereof is hereby acknowledged, and for other good and valuable consideration, I (WE), by these presents do sell, assign and transfer unto said ASSIGNEE, the full and exclusive right to the said invention in the United States and its territorial possessions and in all foreign countries and the entire right, title and interest in and to any and all Letters Patent which may be granted therefor in the United States and its territorial possessions and in any and all foreign countries and in and to any and all divisions, reissues, continuations, substitutions and renewals thereof.

I (WE) hereby authorize and request the Patent Office Officials in the United States and its territorial possessions and any and all foreign countries to issue any and all of said Letters Patent, when granted, to said ASSIGNEE as the assignee of my (our) entire right, title and interest in and to the same, for the sole use and behoof of said ASSIGNEE, its (his) successors and assigns, to the full end of the term for which said Letters Patent may be granted, as fully and entirely as the same would have been held by me (us) had this Assignment and sale not been made.

FURTHER, I (WE) agree that I (WE) will communicate to said ASSIGNEE, or its (his) representatives any facts known to me (us) respecting said invention, and testify in any legal proceeding, sign all lawful papers, execute all divisional, continuation, substitute, renewal and reissue applications, execute all necessary assignment papers to cause any and all of said Letter Patent to be issued to said ASSIGNEE, make all rightful oaths, and, generally do everything possible to aid said ASSIGNEE, its (his) successors and assigns, to obtain and enforce proper protection for said invention in the United States and its territorial possessions and in any and all foreign countries

The undersigned hereby grant(s) the firm of **Keil & Weinkauf**, 1101 Connecticut Ave., N. W., Washington, D. C. 20036 the power to insert on this assignment any further identification. including the application number and filing date, which may be necessary or desirable in order to comply with the rules of the United States Patent and Trademark Office for recordation of this document.

Date: January 5, 2001

(Signature of Inventor) *Wolfram Burst*

Date: January 5, 2001

(Signature of Inventor) *Horst Hartmann*

Date: January 5, 2001

(Signature of Inventor) *Gerd Kaibel*

Date: January 5, 2001

(Signature of Inventor) *Guido Harms*

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:)
HEGER et al.) Applications
)
)
Serial No. 09/640,091)
)
Filed: August 17, 2000)
)

For: TEST UNIT AND PROCESS FOR PRODUCING STABLE FORMULATIONS

PRELIMINARY AMENDMENT

Hon. Commissioner of Patents and Trademarks
Washington, D.C. 20231

Sir:

Please amend the above-identified application as follows:

IN THE CLAIMS

Please amend the claim 1 as follows:

1. A dividing wall column divided in the middle region into a feed section and an offtake section by a [dividng] dividing wall and having as segments

a) an upper column region,

b) an enrichment section of the feed section,

c) a stripping section of the feed section,

d) an upper part of the offtake section,

e) a lower part of the offtake section,

f) an intermediate region of the feed section,

g) an intermediate region of the offtake section

and

h) a lower column region,

where the dividing wall is located vertically between the segments b) and d) and between the segments c) and e) , the segments b) , d) , c) and e) have separation-active internals and the cross-sectional area A_b of the segment b)) is at least 10% smaller than the cross-sectional area A_d of segment d) , and the cross-sectional area A_c of the segment c) is at least 10% greater than the cross-sectional area A_e of segment e).

REMARKS

Claim 1 has been amended to eliminate a typographical error. A clean copy of the claims is attached.

Entry of the above amendment is respectfully solicited.

Respectfully submitted,

KEIL & WEINKAUF

/HBKeil

Herbert B. Keil
Reg. No. 18,967

1101 Connecticut Ave., N.W.
Washington, D.C. 20036
(202)659-0100

CLAIMS AFTER PRELIMINARY AMENDMENT OZ 51193

1. A dividing wall column divided in the middle region into a feed section and an offtake section by a dividing wall and having as segments

a) an upper column region,

b) an enrichment section of the feed section,

c) a stripping section of the feed section,

d) an upper part of the offtake section,

e) a lower part of the offtake section,

f) an intermediate region of the feed section,

g) an intermediate region of the offtake section

and

h) a lower column region,

where the dividing wall is located vertically between the segments b) and d) and between the segments c) and e) , the segments b) , d) , c) and e) have separation-active internals and the cross-sectional area A_b of the segment b)) is at least 10% smaller than the cross-sectional area A_d of segment d) , and the cross-sectional area A_c of the segment c) is at least 10% greater than the cross-sectional area A_e of segment e).

2. A dividing wall column as claimed in claim 1, wherein the cross-sectional area A_b of the segment b) is at least 40%, preferably at least 60%, smaller than the cross-sectional area A_d of segment d) .

3. A dividing wall column as claimed in claim 1, wherein the cross-sectional area A_c of

the segment c) is at least 40%, preferably at least 60%, greater than the cross-sectional area of segment e) .

4. A dividing wall column as claimed in claim 1, wherein the dividing wall is arranged obliquely between the segments f) and g) and forms an angle of from 25 to 75°, preferably from 55 to 65°, to the horizontal.

5. A dividing wall column as claimed in claim 1, wherein the operating pressure P is in the range from 0.0005 to 10 bar and the calculated ratios of the cross-sectional areas A'_b/A'_d and A'_c/A'_e are given by the following relationships

$$\frac{A'_b}{A'_d} = \left(\frac{m_{s,b}}{m_{s,d}}\right) \times \left(\frac{m_{i,b}}{m_{i,d}}\right)^C$$

$$\frac{A'_c}{A'_e} = \left(\frac{m_{s,c}}{m_{s,e}}\right) \times \left(\frac{m_{i,c}}{m_{i,e}}\right)^C$$

where A'_b, A'_d, A'_c,A_e are the cross-sectional areas of the segments b,d,c,e provided for the calculation; $m_{s,b}$, $m_{s,d}$, $m_{s,c}$, $m_{s,e}$ are the volume flows of gas through the segments b,d,c,e, measured in m^3 /h; $m_{i,b}$, $m_{i,d}$, $m_{i,c}$, $m_{i,e}$ are the volume flows of liquid through the segments b,d,c,e, measured in m^3/h, and the exponent C is obtained as operating-pressure-dependent variable from the empirically determined function shown in Fig. 3, and the cal- culated ratios A'_b/A'_d and A'_c/A'_e deviate from the corresponding, actual ratios A_b/A_d and A_c/A_e by not more than 30%, preferably not more than 20%.

6. A dividing wall column as claimed in claim 1, where- in the operating pressure is

from 0.0005 to 0.02 bar and liquid distributors in which the liquid predistribution occurs by the bank-up principle and the downstream fine liquid distribution occurs by the capillary principle are used.

7. A dividing wall column as claimed in claim 1, wherein ordered packing having a cross-channel structure is used as separation-active internals.

8. A dividing wall column as claimed in claim 1, wherein ordered packing having a cross-channel structure is used as separation-active internals and the uppermost layer of packing below the liquid distributor is aligned so that the individual layers are aligned parallel to the dividing wall.

9. A process for isolating pure ethylhexyl p-methoxy- cinnamate by distillation using a dividing wall column as claimed in any of claims 1 to 8, wherein the feed mixture introduced comprises from 70 to 95%, preferably from 75 to 90%, of ethylhexyl p-methoxycinnamate as intermediate-boiling desired product.

February 14, 2001

BURST et al.
New Application 51193

Received: spec., declaration, assignment, prel. amend
check for $750.00 and 3 sheets of drawings

PLEASE HOLD FOR SERIAL NO. AND FILING DATE

APPENDIX B

APPENDIX C

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING DATE	GRP ART UNIT	FIL FEE REC'D	ATTY.DOCKET.NO	DRAWINGS	TOT CLAIMS	IND CLAIMS
09/782,305	02/14/2001	1764	980	51193		9	1

CONFIRMATION NO. 2456

FILING RECEIPT

OC000000005895834

Messrs. Keil & Weinkauf
1101 Connecticut Ave., N.W.
Washington, DC 20036

Date Mailed: 03/23/2001

Receipt is acknowledged of this nonprovisional Patent Application. It will be considered in its order and you will be notified as to the results of the examination. Be sure to provide the U.S. APPLICATION NUMBER, FILING DATE, NAME OF APPLICANT, and TITLE OF INVENTION when inquiring about this application. Fees transmitted by check or draft are subject to collection. Please verify the accuracy of the data presented on this receipt. **If an error is noted on this Filing Receipt, please write to the Office of Initial Patent Examination's Customer Service Center. Please provide a copy of this Filing Receipt with the changes noted thereon. If you received a "Notice to File Missing Parts" for this application, please submit any corrections to this Filing Receipt with your reply to the Notice. When the PTO processes the reply to the Notice, the PTO will generate another Filing Receipt incorporating the requested corrections (if appropriate).**

Applicant(s)

Wolfram Burst, Mannheim, GERMANY;
Horst Hartmann, Bohl-Iggelheim, GERMANY;
Gerd Kaibel, Lampertheim, GERMANY;
Guido Harms, Limburgerhof, GERMANY;

Continuing Data as Claimed by Applicant

Foreign Applications

GERMANY 10008634.9 02/24/2000

If Required, Foreign Filing License Granted 03/22/2001

Projected Publication Date: 08/30/2001

Non-Publication Request: No

Early Publication Request: No

Title

Dividing wall column for fractionation of a multicomponent mixture

Preliminary Class

202

Data entry by : MILANI, JALEH **Team :** OIPE **Date:** 03/23/2001

LICENSE FOR FOREIGN FILING UNDER
Title 35, United States Code, Section 184
Title 37, Code of Federal Regulations, 5.11 & 5.15

GRANTED

The applicant has been granted a license under 35 U.S.C. 184, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" followed by a date appears on this form. Such licenses are issued in all applications where the conditions for issuance of a license have been met, regardless of whether or not a license may be required as set forth in 37 CRF 5.15. The scope and limitations of this license are set forth in 37 CFR 5.15(a) unless an earlier license has been issued under 37 CFR 5.15(b). The license is subject to revocation upon written notification. The date indicated is the effective date of the license, unless an earlier license of similar scope has been granted under 37 CFR 5.13 or 5.14.

This license is to be retained by the licensee and may be used at any time on or after the effective date thereof unless it is revoked. This license is automatically transferred to any related applications(s) filed under 36 CFR 1.53(d). This license is not retroactive.

The grant of a license does not in any way lessen the responsibility of a licensee for the security of the subject matter as imposed by any Government contract or the provisions of existing laws relating to espionage and the national security or the export of technical data. Licensees should apprise themselves of current regulations especially with respect to certain countries, of other agencies, particularly the Office of Defense Trade Controls, Department of State (with respect to Arms, Munitions and Implements of War (22 CFR 121-128)); the Office of Export Administration, Department of Commerce (15 CFR 370.10 (j)); the Office of Foreign Assets Control, Department of Treasury (31 CFR Parts 500+) and the Department of Energy.

NOT GRANTED

No license under 35 U.S.C. 184 has been granted at this time, if the phrase "IF REQUIRED, FOREIGN FILING LICENSE GRANTED" DOES NOT appear on this form. Applicant may still petition for a license under 37 CFR 5.12, if a license is desired before the expiration of 6 months from the filing date of the application. If 6 months has lapsed from the filing date of this application and the licensee has not received any indication of a secrecy order under 35 U.S.C. 181, the licensee may foreign file the application pursuant to 37 CFR 5.15 (b).

PLEASE NOTE the following information about the Filing Receipt:

- The articles such as **"a," "an"** and **"the"** are not included as the first words in the title of an application. They are considered to be unnecessary to the understanding of the title.
- The words **"new," "improved," "improvements in"** or **"relating to"** are not included as first words in the title of an application because a patent application, by nature, is a new idea or improvement.
- The title may be truncated if it consists of more than 600 characters (letters and spaces combined).
- The docket number allows a maximum of 25 characters.
- If your application was submitted under 37 CFR 1.10, your filing date should be the "date in" found on the Express Mail label. If there is a discrepancy, you should submit a request for a corrected Filing Receipt along with a copy of the Express Mail label showing the "date in."
- The title is recorded in sentence case.

Any corrections that may need to be done to your Filing Receipt should be directed to:

Assistant Commissioner for Patents
Office of Initial Patent Examination
Customer Service Center
Washington, DC 20231

APPENDIX D

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/782,305		Wolfram Burst	51193

CONFIRMATION NO. 2456

26474
KEIL & WEINKAUF
1350 CONNECTICUT AVENUE, N.W.
WASHINGTON, DC 20036

WITHDRAWAL NOTICE

OC000000008333631

Date Mailed: 06/21/2002

WITHDRAWAL OF PREVIOUSLY SENT NOTICE

The Notice mailed on 03/23/2001 was sent in error and is hereby withdrawn. A corrected Notice is enclosed. The time period for reply runs from the mail date of the corrected Notice. We apologize for any inconvenience this caused.

A copy of this notice MUST be returned with the reply.

Customer Service Center
Initial Patent Examination Division (703) 308-1202
PART 1 - ATTORNEY/APPLICANT COPY

8-21

APPENDIX E

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
WASHINGTON, D.C. 20231
www.uspto.gov

APPLICATION NUMBER	FILING/RECEIPT DATE	FIRST NAMED APPLICANT	ATTORNEY DOCKET NUMBER
09/782,305	02/14/2001	Wolfram Burst	51193

CONFIRMATION NO. 2456

26474
KEIL & WEINKAUF
1350 CONNECTICUT AVENUE, N.W.
WASHINGTON, DC 20036

FORMALITIES LETTER

OC000000008333655

Date Mailed: 06/21/2002

NOTICE OF INCOMPLETE NONPROVISIONAL APPLICATION

FILED UNDER 37 CFR 1.53(b)

A filing date has NOT been accorded to the above-identified application papers for the reason(s) indicated below.

All of the items noted below **and a newly executed oath or declaration covering the items must** be submitted within **TWO MONTHS** of the date of this Notice, unless otherwise indicated, or proceedings on the application will be terminated *(37 CFR 1.53(e))*.

The filing date will be the date of receipt of all items required below, unless otherwise indicated. Any assertions that the item(s) required below were submitted, or are not necessary for a filing date, must be by way of petition directed to the attention of the Office of Petitions accompanied by the $130.00 petition fee *(37 CFR 1.17(h))*. If the petition states that the application is entitled to a filing date, a request for a refund of the petition fee may be included in the petition.

- The application was deposited without drawings. 35 U.S.C. 113 (first sentence) requires a drawing "where necessary for the understanding of the subject matter sought to be patented." *Applicant should reconsider whether the drawings are necessary under 35 U.S.C. 113 (first sentence).*

A copy of this notice MUST be returned with the reply.

Customer Service Center
Initial Patent Examination Division (703) 308-1202
PART 1 - ATTORNEY/APPLICANT COPY

MDMCA off

WEDNESDAY - AUGUST 21, 2002

~~** Moore 719,353 Issue Fee~~ 8-21

~~** Juyleen 763,710 Issue Fee~~ 8.21

~~** VonDeyn 831,400 Issue Fee~~ * ~~See file DW to be filed~~ 815 8-21 *

~~Kothmode $268,719 amend~~ 6-27

~~Bidell 525,063 Final~~ 8-16

~~Bidell 525,063 Notice of appeal~~ see 9-21

~~Fuchs 08/952209 RCE/CAFC Appeal~~ CPT 8-21

~~Burst 782305 Incomplete Appl.~~ 7-10 (MS)

~~5,391,155~~
~~7/5~~
~~Sachse~~

APPENDIX H

July 10, 2002

BURST et al. Serial No. 09/782,305

Petition to Accord Filing Date, copy of PTO stamped postcard receipt, copy of attorney docket record for dates 2/13/2001 - 2/15/2001

APPENDIX I

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/782,305		Wolfram Burst	51193

CONFIRMATION NO. 2456

26474
KEIL & WEINKAUF
1350 CONNECTICUT AVENUE, N.W.
WASHINGTON, DC 20036

ABANDONMENT/TERMINATION LETTER

OC000000012849092

Date Mailed: 06/02/2004

NOTICE OF ABANDONMENT UNDER 37 CFR 1.53 (f) OR (g)

The above-identified application is abandoned for failure to timely or properly reply to the Notice to File Missing Parts (Notice) mailed on 06/21/2002.

- No reply was received.

A petition to the Commissioner under 37 CFR 1.137 may be filed requesting that the application be revived.

Under 37 CFR 1.137(a), a petition requesting the application be revived on the grounds of **UNAVOIDABLE DELAY** must be filed promptly after the applicant becomes aware of the abandonment and such petition must be accompanied by: (1) an adequate showing of the cause of unavoidable delay; (2) the required reply to the above-identified Notice; (3) the petition fee set forth in 37 CFR 1.17(l); and (4) a terminal disclaimer if required by 37 CFR 1.137(d).

Under 37 CFR 1.137(b), a petition requesting the application be revived on the grounds of **UNINTENTIONAL DELAY** must be filed promptly after applicant becomes aware of the abandonment and such petition must be accompanied by: (1) a statement that the entire delay was unintentional; (2) the required reply to the above-identified Notice; (3) the petition fee set forth in 37 CFR 1.17(m); and (4) a terminal disclaimer if required by 37 CFR 1.137(d).

Any questions concerning petitions to revive should be directed to the "Office of Petitions" at (703) 305-9282.Petitions should be mailed to: Mail Stop Petitions, Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450.

A copy of this notice <u>MUST</u> be returned with the reply.

Customer Service Center
Initial Patent Examination Division (703) 308-1202

PART 1 - ATTORNEY/APPLICANT COPY

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/782,305		Wolfram Burst	51193

CONFIRMATION NO. 2456

26474
KEIL & WEINKAUF
1350 CONNECTICUT AVENUE, N.W.
WASHINGTON, DC 20036

ABANDONMENT/TERMINATION LETTER

OC000000012849092

Date Mailed: 06/02/2004

NOTICE OF ABANDONMENT UNDER 37 CFR 1.53 (f) OR (g)

The above-identified application is abandoned for failure to timely or properly reply to the Notice to File Missing Parts (Notice) mailed on 06/21/2002.

- No reply was received.

A petition to the Commissioner under 37 CFR 1.137 may be filed requesting that the application be revived.

Under 37 CFR 1.137(a), a petition requesting the application be revived on the grounds of **UNAVOIDABLE DELAY** must be filed promptly after the applicant becomes aware of the abandonment and such petition must be accompanied by: (1) an adequate showing of the cause of unavoidable delay; (2) the required reply to the above-identified Notice; (3) the petition fee set forth in 37 CFR 1.17(l); and (4) a terminal disclaimer if required by 37 CFR 1.137(d).

Under 37 CFR 1.137(b), a petition requesting the application be revived on the grounds of **UNINTENTIONAL DELAY** must be filed promptly after applicant becomes aware of the abandonment and such petition must be accompanied by: (1) a statement that the entire delay was unintentional; (2) the required reply to the above-identified Notice; (3) the petition fee set forth in 37 CFR 1.17(m); and (4) a terminal disclaimer if required by 37 CFR 1.137(d).

Any questions concerning petitions to revive should be directed to the "Office of Petitions" at (703) 305-9282.Petitions should be mailed to: Mail Stop Petitions, Commissioner for Patents, P.O. Box 1450, Alexandria VA 22313-1450.

A copy of this notice <u>MUST</u> be returned with the reply.

Customer Service Center
Initial Patent Examination Division (703) 308-1202

PART 2 - COPY TO BE RETURNED WITH RESPONSE

UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NUMBER	FILING OR 371(C) DATE	FIRST NAMED APPLICANT	ATTY. DOCKET NO./TITLE
09/782,305		Wolfram Burst	51193

CONFIRMATION NO. 2456

26474
KEIL & WEINKAUF
1350 CONNECTICUT AVENUE, N.W.
WASHINGTON, DC 20036

ABANDONMENT/TERMINATION LETTER

OC000000012849092

Date Mailed: 06/02/2004

NOTICE OF ABANDONMENT UNDER 37 CFR 1.53 (f) OR (g)

The above-identified application is abandoned for failure to timely or properly reply to the Notice to File Missing Parts (Notice) mailed on 06/21/2002.

- No reply was received.

A petition to the Commissioner under 37 CFR 1.137 may be filed requesting that the application be revived.

Under 37 CFR 1.137(a), a petition requesting the application be revived on the grounds of **UNAVOIDABLE DELAY** must be filed promptly after the applicant becomes aware of the abandonment and such petition must be accompanied by: (1) an adequate showing of the cause of unavoidable delay; (2) the required reply to the above-identified Notice; (3) the petition fee set forth in 37 CFR 1.17(l); and (4) a terminal disclaimer if required by 37 CFR 1.137(d).

Under 37 CFR 1.137(b), a petition requesting the application be revived on the grounds of **UNINTENTIONAL DELAY** must be filed promptly after applicant becomes aware of the abandonment and such petition must be accompanied by: (1) a statement that the entire delay was unintentional; (2) the required reply to the above-identified Notice; (3) the petition fee set forth in 37 CFR 1.17(m); and (4) a terminal d... ...ired by 37 CFR 1.137(d).

Any questions concerning petitions to revive should ... 5-
9282.Petitions should be mailed to: Mail Stop Petitio ... exandria VA
22313-1450.

This is a mistake we have already filed a Petition 7-10-02 no response from PTO

A copy of this notice MU

Customer Service Center
Initial Patent Examination Division (703) 308-1202
PART 1 - ATTORNE

APPENDIX G

#10

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of)
)
BURST et al.) Attn: Application Branch
)
Serial No. 09/782,305)
)
Filed: February 14, 2001)
)
For: DIVIDING WALL COLUMN FOR FRACTIONATION OF A MULTICOMPONENT MIXTURE

RECEIVED
APR 28 2010
OFFICE OF PETITIONS

I hereby certify that this correspondence is being deposited with the United States Postal Service as first class mail in an envelope addressed to: Commissioner of Patents and Trademarks, Washington, D.C. 20231, on:
July 10, 2002
Date of Deposit
Jason D. Voight
Person Making Deposit
Jason D. Voight
Signature
July 10, 2002
Date of Signature

Honorable Commissioner of
Patents and Trademarks
Washington, D.C. 20231

PETITION TO ACCORD FILING DATE

In response to the Notice of Incomplete Nonprovisional Application of June 21, 2002, applicants urge that the application is entitled to a filing date of February 14, 2001.

The Notice states that the application was deposited without drawings. However, as evidenced by the enclosed postcard receipt, 3 sheets of drawings were deposited with the application as filed on February 14, 2001. Therefore, the application, including the 3 sheets of drawings, should be accorded a filing date of February 14, 2001. Alternatively, a filing date of February 14, 2001 should be accorded because the drawings are not necessary under 35 U.S.C. 113.

If necessary, please charge the $130 petition fee under 37 CFR 1.17(h) to Deposit Account No. 11.0345. However, in the event this petition is granted, applicants urge that no fee should be due, or alternatively that the fee should be refunded by way of a credit to said deposit account.

Please charge any shortage in fees due in connection with the filing of this paper, including Extension of Time fees to Deposit Account No. 11.0345. Please credit any excess fees to such deposit account.

Respectfully submitted,

KEIL & WEINKAUF

Jason D. Voight

Jason D. Voight
Reg. No. 42,205

1350 Connecticut Avenue, N.W.
Washington, D.C. 20036
(202) 659-0100
JDV/mks

2/13 Schwab 283201 CPA & Prel. Amd 710—
2/13 Theis 49391 PCT Appl, Spec, dec, assign Prel. Amd 900—
2/13 Fischer 49338 " " " " " " " , IDS w/5 ref 900—
2/13 Hoellwarth-Oberholz 726,040 IDS w/3 refs
2/13 McKee 734026 IDS w/2 refs
2/13 Stam 720913 IDS w/5 refs

2/14 Bidell 194402 Notice of Appeal + 1 mo ext. 420—
2/14 Broecker 333705 RCE + Prel. Amend 710—
2/14 Ilmer 78/7019 Spec, decl, IDS, assign, P. amend 900
2/14 Goerrissen 49301 Spec, decl, IDS, assign, P. amend 900
2/14 Klatt 49307, Spec, decl, assign, IDS, P. amend 900
2/14 Rademacher 50060 Spec, decl, assign, P. amend 900
2/14 Wenzel 51202 Spec, decl, assign 750
2/14 Waldorff 51200, Spec, decl, assign, 3 draw, Cl to Prio, P. amend 750
2/14 Witkowski 51198, Spec, decl, assign Cl to Prio, P. amend 750
2/14 Burst 51193 Spec, decl, assign, P. amend, 3 drawings 750
2/14 Rademacher, 50068 Spec, decl assign, P. amend 900
2/14 Kim Spec, decl, assign, P. amend 49321 900
2/14 Henkelmann 51204, Spec, decl, assign. 750
2/14 Klemm 732/000031, Spec, decl, assign IDS, 3 drawings 750
2/14 CHROMALITE 76/194956 Req Corr. Filing Rct

15 Brunner 581843 Suppl Amd via Fax
15 Meffert 372810 Amendment
5 Falkenberg 743894 COFR
5 Stamm 623171 Amendment
5 Weyer 529811 Req. for Recon of Final
15 Kristen 712282 IDS w/20 refs
15 Auweter 712294 IDS w/10 refs
15 Stuermer 720914 IDS w/5 refs

February 14, 2001

BURST et al.
New Application 51193

Received: spec., declaration, assignment, prel. amend
check for $750.00 and 3 sheets of drawings

PLEASE HOLD FOR SERIAL NO. AND FILING DATE

09782305

6-21-02 office action

stamped postcard.

postcard 2-14-01 states "3 sheets of drawings"

6-2-04 ntc abd.

no drugs noted on transmittal page

nothing done

Clm 9 process claim

6-21-02

fees petition filed 7-15-02 (6)

ntc of incomplete application

No drugs.

did we need it??

will not charge fee to deposit acct.

Mada March
ounces
grams